



City Research Online

City, University of London Institutional Repository

Citation: Lingas, A., Pentcheva, B., Abel, J., Cappella Romana, , Eruçman, D., Antonopoulos, S. & Canfield-Dafilou, E. (2019). Lost Voices of Hagia Sophia: Medieval Byzantine Chant Sung in the Virtual Acoustics of Hagia Sophia. The Feast of the Exaltation of the Holy Cross in Constantinople. Cappella Romana.

This is the published version of the paper.

This version of the publication may differ from the final published version.

Permanent repository link: <https://openaccess.city.ac.uk/id/eprint/23941/>

Link to published version:

Copyright: City Research Online aims to make research outputs of City, University of London available to a wider audience. Copyright and Moral Rights remain with the author(s) and/or copyright holders. URLs from City Research Online may be freely distributed and linked to.

Reuse: Copies of full items can be used for personal research or study, educational, or not-for-profit purposes without prior permission or charge. Provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way.



LOST VOICES OF HAGIA SOPHIA CAPPELLA ROMANA

LOST VOICES OF HAGIA SOPHIA

Medieval Byzantine Chant Sung in the Virtual Acoustics of Hagia Sophia

CAPPELLA ROMANA

Alexander Lingas, music director and founder

The Feast of the Exaltation of the Holy Cross in Constantinople

From the Office of Sung Vespers

- | | | | |
|---|---|----------------|------|
| 1 | Final (Teleutaion) Antiphon before the Entrance,
(Ps. 98:9), Mode Plagal 2 | MS Athens 2062 | 5:13 |
| 2 | Psalm 140 with Refrain (Kekragarion) | MS Athens 2062 | 7:04 |

From the Office of Sung Matins

Antiphon 7

- | | | | |
|---|--|----------------------|------|
| 3 | Small litany and Old Kalophonic Antiphon, Mode Plagal 4 | MSS Athens 2601 | 9:31 |
| 4 | Choral stichologia (selected verses of Ps. 109–112, “Palaion”) | After MS Athens 2061 | 3:21 |
| 5 | Ode 4 of the Canon of the Precious Cross | Mt. Athos Iveron 470 | 6:39 |

From the Ceremony of the Exaltation of the Holy Cross

Troparion: “Lord, save your people”

- | | | | |
|---|---|----------------------------------|------|
| 6 | Syllabic melody | After MS Athens 2062 | 1:09 |
| 7 | Asmatikon melody | Mt. Athos Lavra Γ 3 & Kastoria 8 | 4:23 |
| 8 | Kontakion: “Lifted Up on the Cross,” short melody, Mode 4 | St. Petersburg NLR gr. 674 | 2:11 |
| 9 | Sticheron, for the Adoration of the Cross
by Emperor Leo VI “The Wise”: “Come believers, let us worship the Life-giving Cross,” Mode 2 | MS Vienna Theol. Gr. 181 | 6:02 |

Selections from the Divine Liturgy

10	Troparion instead of the Trisagion “Your Cross we Worship”	MSS Athens 2061, 2062, and 2458; Mt. Athos Lavra Γ 3; and Vienna Theol. gr. 185	12:57
11	Prokeimenon: (Gradual, Ps. 98:9, 1-2), Barys Mode	MSS Patmos 221 and Sinai gr. 1280	5:23
12	Asmatikon Cherubic Hymn		12:55
	Part 1: Choir	MS Grott. Γ.γ.1	
	Part 4: Solo (Asma, excerpt)	MS Messina gr. 161	
	Part 5: Choir	MS Grott. Γ.γ.1	
		<i>CD AUDIO TOTAL</i>	<i>76:50</i>

Also included on the Blu-ray™ disc

13	Communion Verse, “The Light of your Countenance,” Mode 4	MS Grott. Γ.γ.1	3:35
		<i>BLU-RAY™ AUDIO TOTAL</i>	<i>80:00</i>

Documentary film

The Voice of Hagia Sophia	23:43
Directed, Edited, and Co-produced by Duygu Eruçman; Produced by Bissera V. Pentcheva	
Cinematography by Meryem Yavuz, Michael Seely, and Ben Wu	
© 2018 Bissera V. Pentcheva	

N.B. Timings are those of the CD stereo recording; those on the surround and high-resolution versions encoded on the Blu-ray™ disc are slightly longer.

ICONS OF SOUND: HAGIA SOPHIA AND THE SENSORIAL MANIFESTATION OF THE DIVINE

Bissera V. Pentcheva

Singing is the exhalation of breath or *pneuma* in Greek, where the same word also identifies the Holy Spirit. The double semantics enables the perception of singing as a form of inspiration and vivification. The physics of this process only enhances this experience: the expelled breath is energy that propagates in space and becomes consumed by the material surfaces and bodies present in an interior space. Chant creates icons of sound, audible and tactile, since the sonic energy is both heard by the ears and felt by the skin. But the images it carries do not resolve themselves in the visible. The monumental mosaics in Hagia Sophia, ordered by Emperor Justinian (527–565), sustain this aniconic aesthetic. They eschew the human figure and only show geometric and vegetal motifs (Fig. 1). This original decoration combined with the book-matched marbles creates an interior where the divine is an abstraction rather than a representation. Here sound and light become the primary channels through which the metaphysical can be felt.

Built in a swift campaign from 532 to 537, Hagia Sophia overwhelms with its enormous interior. The dome rises 56.60 meters above the floor and has a maximum diameter of 31.87 meters. The height of this space thus exceeds by far the tallest of medieval



Fig. 1 Hagia Sophia, 532–37 and 562, interior (© Erich Lessing/Art Resource, NY)

cathedrals of Western Europe. The vast interior volume of the nave is 255,800 cubic meters and is covered with marble revetments. As a result, the space is extremely reverberant; frequencies in the range of the human voice can be sustained for up to twelve seconds. And this makes the acoustics far more reverberant or “wet” than the standard concert halls, where four seconds is already considered extreme. Hagia Sophia can house large audiences, over 16,000 people, thus transforming into a grand stage for public ceremony and religious ritual.

Form dematerializes both in its sonic and optical appearance in Hagia Sophia. The chant of the cathedral's élite singers is characterized with rich use of melismas (multiple notes sung to a single syllable or vowel) and intercalations (the insertion of vocables – non-semantic syllables or vowels – in the words as for instance $\chi\epsilon\ \chi\epsilon$ [$he\ he$] or $\chi\alpha\ \chi\alpha$ [$ha\ ha$]). These two types of ornamentation stretch the semantic chains and challenge the access to the meaning of words. The reverberant acoustics further enhance this process of blurring of meaning, where language is pushed beyond the register of human speech. If the melismas and intercalations veil the semantics of the chanted word and if the acoustics further diffuse the semantic chains, the interior of the Great Church is also designed to produce optical correlates to these sonic phenomena. The marble, gold, and sunlight make the divine visual but not tied to anthropomorphic figuration or a fixed and legible form. They create phenomena such as glitter, shadow, and the paradoxical effect of dematerialization of stone brought about by solidification of bounded light (p. 12, fig. 1, and cover).

Form-dissolution also taps into the aesthetics of coruscating water or *marmarygma* in Greek. The root *marmar-* is in both *marmaron* (marble) and *marmarygma* (glitter) and can be visually encountered in the book-matched marble of the wall revetments and pavement. The dove-colored stone from Prokonnessos (also known as Marmara island in the Aegean) is cut and splayed open so that its veins form a continuous undulating contour evocative of sea waves (Fig. 2). The glitter of the gold mosaic completes this *marmar*-aesthetic adding temporality

and animacy to the static designs. This vision of the quivering sea harmonizes further with the “wet” acoustics of Hagia Sophia. And we know that the perception of wet sound and shimmering radiance conjured a vision of the divine. Pseudo-Dionysios in his analysis of the liturgy (*De caelesti hierarchia*, bk. 7, ch. 4) associates the presence of the Lord with the “sound of many waters,” quoting Ezekiel 1:24 and The Book of Revelation 14:2 and 19:6 and with the effusion of a powerful ray of light. Drawing on the Old and New Testament conceptualization of divinity as a bright and powerful voice, audible in the streams of many waters, the Justinianic décor and acoustics of Hagia Sophia gave this conceptual theophany sensorial reality.

In his sixth-century description of the Great Church, Paul the Silentiary wrote how the chant of the élite choir singing from the ambo mixed the human voice (*phōnē*) with the divine utterance



Fig. 2 Book-matched marble revetment in Hagia Sophia, 532–537 and 562 (Photo: Bissera V. Pentcheva)



Fig. 3 Feast of the Exaltation of the Cross from the ambo of Hagia Sophia, Vatican City, BAV, MS Gr. 1613, p. 35, ca. 1000

(*omphē*) making Christ aurally present like an icon of sound: “In its center the God-fearing choristers (*hymnopoloi*) of Christ [give presence through] their voice to the divine sound (*omphē*) of immaculate breath/Spirit that proclaimed the human childbirth of Christ among men” (Paul, *Descriptio ambonis*, ll. 30–32). *Omphē* is a Homeric word; it designates the voice that is beyond the human register of speech: metaphysical and incomprehensible. The synergy between the reverberant acoustics and the élite choir of the *psaltai* singing with rich melismas and intercalations could simulate this divine *omphē*, producing a reverberant, bright sound where meaning is blurred. The metaphysical association of this resonant voice of the Great Church can be grasped from the term used to designate the élite singers: *hymnopoloi*. *Poloi* can be translated as both “singers” and “universal axēs,” or “pivots” around which the earth or other celestial bodies revolve. Thus the song they produced sonified the so-called *musica mundana* or music of the celestial spheres.

The important role of the élite choir was bolstered by the place from which they sang: the ambo or platform. This was an alabaster or onyx structure set under the Eastern periphery of the dome. Its ellipsoidal platform was supported on eight columns and had two staircases aligned along the east-west axis (Figs. 3–4). A corridor circled around the ambo and stairs; this feature allowed the *psaltai* and clergy to move around the platform and to take turns in using it to project their voices from there. When they sang their solo parts, the *psaltai* ascended the steps. As they expelled their breath in the air under the dome, they produced a “column,” or *polos*, of sonic energy, rising from earth to heaven, which activated the acoustics of the dome.

Raised over fifty-six meters above the floor, the cupola reflects and scatters the sound waves over a much wider area of the floor. The dome is especially reflective of high-frequency sound, reinforcing these particular harmonics in the interior. The shape of the cupola can both concentrate and scatter the sound energy. This phenomenon stirs the synesthetic effect of aural and optical brightness as it combines the acoustic reflection with the visual reflection of light off the gold mosaic surface of the dome. As a result, the sonic and visual brightness in Hagia Sophia acts as a mirror reflecting the imagined splendor of the angelic choirs (Fig. 1).

Two chants in this album, the troparion *Sōson Kyrie ton laon sou* or “Lord, save your people” and kontakion *Ho hypsōtheis en tō Staurō* or “Lifted up on the Cross,” were composed specifically for Hagia Sophia when the Feast of the Exaltation of the Cross was

introduced in cathedral liturgy in 628. The auralizations of these hymns in the acoustics of Hagia Sophia allow contemporary listeners to hear how the singing of the high notes imbued in the melismas and intercalations create a sonic attack on the dome. As a result of the concentration, reflection, and scat-

tering of these impacts, some of this bright acoustic energy transforms into a “waterfall” of glittering golden sound. This phenomenon produced by the ornament and the melodic form concentrate attention on words that express divine agency: *eulogēson* “bless” in the troparion and *echoein* “may they have”

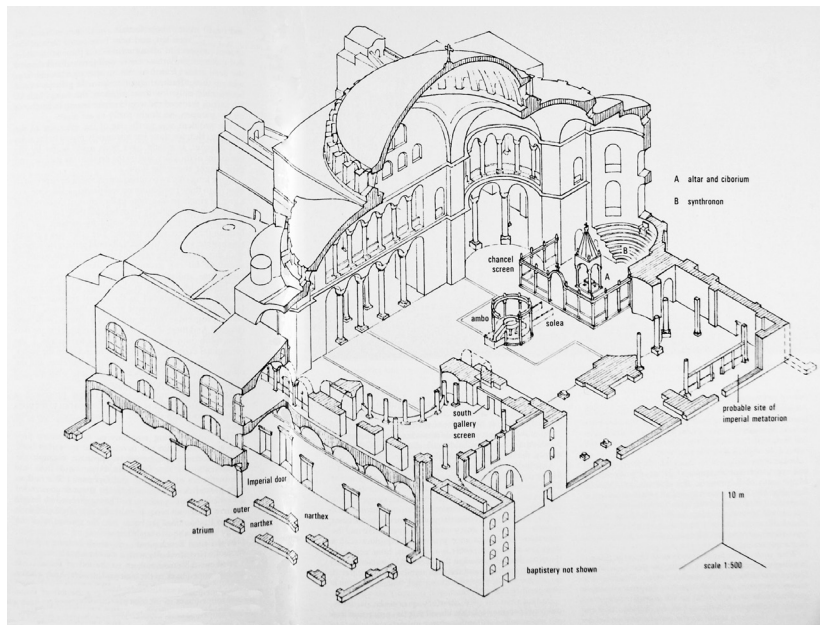


Fig. 4 Hagia Sophia, 537; axonometric drawing of the interior. From R. Mainstone, *Hagia Sophia: Architecture, Structure, and Liturgy of Justinian's Great Church* (London: Thames & Hudson, 1988), fig. 252. (Reproduced with permission of Mainstone.)



Fig. 5 Hagia Sophia, reconstruction of a view from above, revealing the organization of space under the dome (© Lars Grobe, Oliver Hauck, Martin Kim, Andreas Noback, Rudolf H.W. Stichel, Helge Svenshon, Technische Universität Darmstadt)

in the kontakion. The Lord's blessing reifies in the space as a sonic reverberation, a glittering golden blessing "raining" from the dome (Figs. 1, 5). These are ephemeral effects produced by the acoustics of the space. They are examples of the metaphysical as a temporal phenomenon activated in the interior through human agency: chant.

The double semantics of the Greek word *pneuma*, meaning both "breath" and the "Holy Spirit," helps recognize the synergy that exists between human voice, architectural acoustics, and the imagined divine response. The interaction between voice and building is what gave the name of our project "Icons of Sound (2008–present)," which I, Bissera Pentcheva (professor in the Department of the Art and Art History) co-direct with electrical engineer Jonathan Abel (Center for Computer Research in Music and Acoustics) at Stanford University. Our goal has been to restore the lost voice of Byzantium's cathedral. The interior of Hagia Sophia has been off limits for any performance by the human voice since 1935, when Kemal Atatürk, founder and first president (1923–1938) of the Republic of Turkey, secularized this mosque. By turning the space into a museum, Atatürk suppressed the Islamic religious identity of the Ottoman past and proclaimed in its stead the new secular identity of the nascent republic. In recent years, due to politics leading to increased Islamicization, these restrictions have been lifted allowing Quranic recitations to take place in the interior. But these changes have not led to any loosening of the ban placed on Orthodox chant. Digital technology has been the only means for "Icons of Sound" to reconstruct how the cathedral

music would have sounded in this interior. In this decade-long research, we have collaborated closely and fruitfully with Cappella Romana. We started with a recording session in 2011, followed by two concerts (2013 and 2016) at Stanford's Bing Hall in which the performances were imprinted live with the acoustics of the Great Church.

This album, recorded following the 2016 Bing Hall performance, pairs Cappella Romana's singing of the services for the Feast of the Exaltation auralized in the acoustics of Hagia Sophia with a documentary film "The Voice of Hagia Sophia" that traces the history of the building and the activity of the interdisciplinary project "Icons of Sound." The dissolution of linear progression of time, the blurring of semantics, and the transformation of the void under the dome into a cascade of bright acoustic waterfall are aspects of this sensorial manifestation of the metaphysical in the interior of the Great Church. This package of music and film offers an experience – sonic and visual – that allows the listener and viewer to transcend the textual and plunge into the rich sensorial realm of the past culture of Byzantium.

Selected Bibliography

Sharon E. J. Gerstel, Chris Kyriakakis, Konstantinos T. Raptis, Spyridon Antonopoulos, and James Donahue, "Soundscapes of Byzantium: The Acheiropoietos Basilica and the Cathedral of Hagia Sophia in Thessaloniki," *Hesperia: Journal of the American School of Classical Studies at Athens* 87/1 (2018): 177–213.

Alexander Lingas, "From Earth to Heaven: The Changing Musical Soundscape of Byzantine Liturgy," in *Experiencing Byzantium*, eds. C. Nesbitt and M. Jackson (Farnham: Ashgate, 2013), 311–58.

Rowland Mainstone, *Hagia Sophia: Architecture, Structure and Liturgy of Justinian's Great Church* (London: Thames and Hudson, 1988).

Paul the Silentiary and Procopius in Cyril Mango, *The Art of the Byzantine Empire, 312–1453* (Toronto: University of Toronto Press, 1986; rpt., 1993), 72–96.

Bissera V. Pentcheva, *Hagia Sophia: Sound, Space, and Spirit in Byzantium* (University Park: Pennsylvania State University Press, 2017).

Bissera V. Pentcheva, "The Glittering Sound of Imperial Violence: The Chants for the Feast of the Exaltation of the Cross in Hagia Sophia," in: *Icons of Sound: Voice, Architecture and Imagination in Medieval Art*, edited by Bissera V. Pentcheva (New York: Routledge, 2020).

Bissera Pentcheva and Jonathan S. Abel. "Icons of Sound: Auralizing the Lost Voice of Hagia Sophia." *Speculum* 92, no. 5 (2017): S336–60.

Aural Architecture: Music, Acoustics, and Ritual in Byzantium, ed. Bissera V. Pentcheva (Aldershot: Ashgate, 2017).

Nadine Schibille, *Hagia Sophia and the Byzantine Aesthetic Experience* (Farnham: Ashgate, 2014).

CAPPELLA ROMANA

Alexander Lingas, music director and founder

Spyridon Antonopoulos
John Michael Boyer
Kristen Buhler
Aaron Cain
Photini Downie Robinson
Constantine Kokenes
Stelios Kontakiotis

David Krueger
Emily Lau
Kerry McCarthy
Mark Powell
Catherine van der Salm
David Stutz

Cappella Romana

Its performances “like jeweled light flooding the space” (Los Angeles Times), Cappella Romana is a professional vocal ensemble dedicated to combining passion with scholarship in its exploration of the musical traditions of the Christian East and West, with emphasis on early and contemporary music. The ensemble is known especially for its presentations and recordings of medieval Byzantine chant (the Eastern sibling of Gregorian chant), Greek and Russian Orthodox choral works, and other sacred music that expresses the historic traditions of a unified Christian inheritance. Founded in 1991, Cappella Romana has a special commitment to mastering the Slavic and Byzantine musical repertoires in their original languages, thereby making accessible to the general public two

great musical traditions that are little known in the West. The ensemble presents annual concert series in Portland, Oregon, Seattle, Washington, and San Francisco, California, in addition to touring nationally and internationally, most recently to Hungary, Serbia, and the UK. Critics have consistently praised Cappella Romana for their unusual and innovative programming, including numerous world and American premieres. Cappella Romana has released more than twenty recordings.

Right: Cappella Romana in concert at Stanford's Bing Hall, Photograph by Fernando Lopez-Lezcano, CCRMA, Stanford University.





ICONS OF SOUND DIRECTORS

iconsofsound.stanford.edu



Bissera V. Pentcheva is full professor of art history at Stanford University; she has published three books with Pennsylvania State University Press: *Icons and Power: The Mother of God in*

Byzantium, 2006 (received the Nicholas Brown Prize of the Medieval Academy of America, 2010), *The Sensual Icon: Space, Ritual, and the Senses in Byzantium*, 2010, and *Hagia Sophia: Sound, Space and Spirit in Byzantium*, 2017 (received the 2018 American Academy of Religion Award in historical studies), and has edited the volume *Aural Architecture*, Ashgate 2017. Her research has been supported by fellowships from the Guggenheim Foundation, the American Academy of Rome, the Wissenschaftskolleg zu Berlin, Alexander von Humboldt, Mellon New Directions, Onassis Foundation, and Dumbarton Oaks Research Institute.

Left: Hagia Sophia, 532-537 and 562, interior, view of the dome and semi-domes: Photo: Bissera V. Pentcheva.

Bissera V. Pentcheva, Photo: Lisa DeNeffe Photography
Jonathan Abel, Photo: Chryssie Nanou.

Alexander Lingas, Photo: Tori Ava Photography



Jonathan S. Abel is an Adjunct Professor at the Center for Computer Research in Music and Acoustics (CCRMA) in the Department of Music at Stanford University, working in music and audio applications of signal and

array processing, parameter estimation, and acoustics. He was a Co-Founder and Chief Technology Officer of the GRAMMY Award-winning Universal Audio, Inc., a researcher at NASA/Ames Research Center, Chief Scientist at Crystal River Engineering, Inc., and a lecturer in the Department of Electrical Engineering at Yale University. He has consulted for Apple, Dolby, FDNY, LSI Logic, L3 Technologies, Native Instruments, SAIC, Sennheiser, Sigma Cubed, Triple Ring, and the U.S. NRL on topics ranging from audio effects processing to fire department siting and deployment, GPS, medical imaging, room acoustics measurement, and seismic signal processing. He holds Ph.D. and M.S. degrees from Stanford University and an S.B. from MIT, all in electrical engineering. He is a Fellow of the Audio Engineering Society for contributions to audio effects processing.



Alexander Lingas, Music Director and Founder of Cappella Romana, is a Reader in Music at City, University of London, and a Fellow of the University of Oxford's European Humanities

Research Centre. He completed his doctorate on Sunday matins in the rite of Hagia Sophia at the University of British Columbia and then, with the support of a SSHRC postdoctoral fellowship, moved to Oxfordshire to study theology with Metropolitan Kallistos Ware. His present work embraces not only historical study but also ethnography and performance. His awards include Fulbright and Onassis grants for musical studies in Greece with cantor Lycourgos Angelopoulos, the British Academy's Thank-Offering to Britain Fellowship, research leave supported by the Stavros Niarchos Foundation, and the St. Romanos the Melodist medallion of the National Forum for Greek Orthodox Church Musicians (USA). In 2018 His All-Holiness, Bartholomew I, Archbishop of Constantinople-New Rome and Ecumenical Patriarch, bestowed on him the title of *Archon Mousikodidaskalos*.

LOST VOICES OF HAGIA SOPHIA

Alexander Lingas

Voices in Hagia Sophia

For over a millennium, Constantinople (modern Istanbul) was the capital of the East Roman Empire, also known as the Byzantine Empire after the City's ancient name, Byzantium. Emperor Justinian I (527–65) constructed as the empire's cathedral the extant basilica of Holy Wisdom (Hagia Sophia) to replace an older church destroyed in the wake of civil unrest. With his Great Church Justinian inaugurated what Robert Taft has called the “Imperial Phase” of Eastern Christian liturgy. In the year 535 he decreed that worship at Hagia Sophia and its three dependent churches was to be sustained by no fewer than 425 people – 60 priests, 100 deacons, 40 deaconesses, 90 subdeacons, 110 readers, and 25 cantors (*psaltai*) – a number increased to 525 by Heraclius I (610–41).

Between the sixth century and the interruption of Constantinopolitan cathedral worship by the period of Latin rule (1204–61) that followed the Fourth Crusade, nearly everyone praying at Hagia Sophia sang at least occasionally. The group of twenty-five cantors was its musical elite. In addition to singing as a choir, they provided the institution with soloists, some of whom were eunuchs (*castrati*, as they would be known centuries later in Italian opera), and directors skilled in the lost Byzantine art of choral conducting (*cheironomia*). The numerous male



Fig. 1 Hagia Sophia, 532–37 and 562, interior (The Byzantine Institute and Dumbarton Oaks Fieldwork Records and Papers, ca. late 1920s–2000s, MS.BZ.004). Photograph: Courtesy of Image Collections and Fieldwork Archives, Dumbarton Oaks, Trustees for Harvard University, Washington, D.C.)

readers closely supported the *psaltai* in rendering the antiphonal psalmody that dominated the daily cycle of prayer at Hagia Sophia, while at certain times the deaconesses of the Great Church formed a female vocal ensemble. Ordinary members of the congregation participated by singing responses to the litanies, prayers, and blessings of deacons and

priests, as well as by joining in with the refrains of psalms and hymns chanted by choirs and soloists. A choir of boys from the imperial orphanage assisted cathedral personnel in festal worship, as did singers from nearby monasteries. Monks appear also to have contributed substantially to the provision of sung devotions that filled gaps between major services at Hagia Sophia.

Taken together, these professional and amateur singers – clergy, monastics, and laity, men, women, and children – provided worship at Hagia Sophia with considerable sonic and musical variety. Particularly remarkable for listeners accustomed to the sound of modern male choirs singing Byzantine chant is the mixing of high (eunuch, female, and child) and low voices. This feature of medieval church singing in Constantinople, noted with approval in the twelfth century by the visiting French cleric Odo of Deuil, is reflected on this recording by the participation of male and female singers.

The Constantinopolitan Cathedral Rite

Cathedral worship in Constantinople prior to 1204 had three major components: 1) the Eucharist or Communion Service, called the “Divine Liturgy” by modern Orthodox and Byzantine-Rite Catholic Christians; 2) what modern scholars have named the “stational liturgy” of Constantinople, a system of processions that linked Hagia Sophia to churches and civic sites located throughout the imperial capital; and 3) a cycle of services performed daily at particular hours and known collectively in English

as the “Divine Office” or “Liturgy of the Hours,” of which Vespers (at sundown) and Matins (Greek “*Orthros*,” at dawn) were the most important.

The three forms of the Divine Liturgy celebrated at Hagia Sophia are essentially those maintained today by churches of the Byzantine rite: one attributed to St. Basil the Great of Caesarea that served as the primary form of Eucharist through the tenth century; another attributed to St. John Chrysostom that is structurally identical to that of St. Basil, differing mainly in the relative conception of its prayers; and the Divine Liturgy of the Presanctified Gifts, enabling the distribution of previously consecrated Holy Communion after Vespers during periods of fasting. Although the last vestiges of the public stational liturgy of Constantinople vanished with the Ottoman conquest of 1453, elements of its characteristic service of three antiphonal psalms have survived in contemporary Byzantine worship, most notably as the introduction to most Greek celebrations of the Divine Liturgy.

The Divine Office of Hagia Sophia, originally called the *Ecclesiastēs* but known in later Byzantium as the *Asmatikē akolouthia* (“Sung Office”), disappeared with the fall of Byzantium and has left few audible traces on modern Eastern Christian worship. While the presider’s prayers of the *Ecclesiastēs* are regularly used during the modern Byzantine offices of Vespers and Matins, most of them are usually recited silently by the celebrant as texts unrelated to those offices’ sung or said content. Originally, however, these prayers occupied particular places in the daily cycles of the Sung Office of Hagia Sophia, the services of

which long sustained patterns of Christian worship formed in the great urban basilicas of the Late Antique Mediterranean.

Ancient bishops such as Ambrose, Basil and, in Constantinople, John Chrysostom had promoted methods of singing the psalms and other chants from the Bible that featured refrains facilitating the active participation of their congregants. Faithful to these traditions, singing in the Constantinopolitan *Ecclesiastēs* consisted mainly of biblical psalmody performed by soloists, choirs and the congregation in permutations of call and response. In responsorial psalmody a body of singers responded to a soloist, whereas in antiphonal psalmody alternating groups of singers responded to each other.

Little more than a century after the Spanish pilgrim Egeria had observed similar popular psalmody in the cathedral worship of early fifth-century Jerusalem, cantors there had begun to replace simple refrains with sets of newly composed hymns. Starting in the seventh century, churches and monasteries in Constantinople began to adopt the rich tradition of hymnody developing around the Book of the Hours (*Horologion*) of Jerusalem, thereby forming the basis for the hybrid Divine Office of the modern Byzantine rite. At Hagia Sophia, daily worship largely retained its archaic patterns of biblical psalmody punctuated by refrains until the Fourth Crusade. By the twelfth century, however, ritual conservatism in the Rite of the Great Church seems, especially on major feasts, to have been counterbalanced somewhat by musical embellishment of the old psalmodic forms.

Chant Books of the Great Church

Musically notated sources for the Rite of the Great Church of Hagia Sophia are today few in number, with surviving manuscripts coming primarily from the edges of the Byzantine world. Most copies of the *Asmatikon* and the *Psaltikon*, musical collections containing respectively choral and solo chants from the Constantinopolitan cathedral rite, are thirteenth-century manuscripts produced in southern Italy (*Magna graecia*) for Greek monasteries that combined the liturgical traditions of Constantinople and Jerusalem in their worship. Monks there also transmitted a related repertory of melodically sophisticated chants they called the *Asma* (“Song”). Their melodies reflect the emergence of the “kalophonic” (“beautiful sounding”) style of chant that became a mature compositional idiom in late thirteenth- and early fourteenth-century Constantinople with the works of John Glykes and John Koukouzeles, and of Xenos Korones, who served as a soloist and choir-leader at Hagia Sophia.

One feature of the kalophonic style is the extensive use of vocables, syllables without evident semantic meaning previously used in limited ways within Byzantine chant. Soloists, for example, were accustomed to intoning chants with *apechēmata*, brief musical formulas on vocables that announce the current mode or scale degree (*ananéanes*, for example, outlines the descending fifth from A to D in Mode 1). Choral chants of the *Asmatikon* often feature vocables as points of articulation within the long musical phrases of melismata (settings of

a syllable of text to multiple notes). Composers of *kalophonia* went further, augmenting texted works with *teretismata* (extended passages of vocables such as “te-re-re” or “to-to-to”) and even writing abstract musical works usually called *kratemata* (“holders”).

One reason for the small number of surviving manuscript sources for the original rite of Hagia Sophia is that after 1261 the cathedral adopted a version of the Palestinian Divine Office as its standard format for daily prayer. The Sung Office was relegated to occasional celebration, usually with the addition of a few hymns from the Hagiopolite (“from the Holy City,” i.e. Jerusalem) tradition. Changing musical tastes also seem to have played a role, since by the middle of the fourteenth century the old solo and choral repertoires of the Asmatikon and Psaltikon had largely been displaced even when they remained liturgically useful. Nearly everywhere cantors were chanting instead the newer compositions of Koukouzeles, Korones, and their successors, leaders of what Edward Williams has called “a Byzantine *ars nova*.”

The one significant exception to this was the provincial cathedral of Hagia Sophia, Thessalonica, where the Sung Office remained in regular use until the Ottoman conquest of the city in 1430. It is thanks to the persistence of the Thessalonians in maintaining their ancient traditions that we possess music for the two-week cycle of psalmody for the daily offices of the *Ecclesiastēs* in Athens, National Library of Greece 2061 and 2062, a pair of manuscripts copied, respectively, in the early fifteenth and early fourteenth centuries. Priceless also for their

rich witnesses to the form, content, and meaning of the Sung Office are the service books and liturgical commentaries of Saint Symeon, a Constantinopolitan monk who served as Archbishop of Thessalonica from 1416/17 to 1429.

Chants for the Exaltation of the Holy Cross at Hagia Sophia

This recording contains chants for one of the greatest solemnities in the yearly cycle of worship at Hagia Sophia: the Exaltation of the Precious and Holy Cross. The background to this commemoration is summarized in the brief notice for 14 September contained in the modern Greek *Horologion*:

The blessed Helen, mother of Constantine the Great, looked for the Cross in Jerusalem and found it buried in the earth about the year 325. Then the people, seeing it elevated on the ambo by the then patriarch of Jerusalem Makarios, cried out, “Lord, have mercy!” Note that after its finding, part of the precious Cross was taken to Constantinople as a blessing, while the rest was left in Jerusalem. There it remained until the year 614, when the Persians, ravaging Palestine, took it back to their own country (January 22nd). But later, in the year 628, Herakleios led an army against them, took the precious Cross back again and brought it to Constantinople. (Trans. Archimandrite Ephrem Lash)

As indicated here, the feast’s origins are to be found in the establishment of Jerusalem as a site of Chris-

tian pilgrimage by Emperor Constantine I and his mother Helen, who is credited with finding the Cross upon which Jesus Christ was crucified. Commemoration of the Cross on 14 September was an outgrowth of anniversary celebrations for the Constantinian Church of the Resurrection in Jerusalem (known today as the Holy Sepulchre) on 13 September. A distinctly Constantinopolitan tradition of the “Exaltation” (“*Hypsosis*”) of the Cross emerged only after Heraclius I recovered the Cross from the Persians and transferred it to his Great Palace in Constantinople. Less than a decade later the southern provinces of the East Roman (Byzantine) Empire were overwhelmed by Arab invaders and Jerusalem surrendered to Caliph Umar. In the centuries that followed, the Cross served two functions: as a sacred object offered to the public at certain times of the year for veneration in Hagia Sophia along with other relics of Christ’s Passion, and as a symbol of imperial power deployed in court ritual and on military campaigns.

One annual five-day period of veneration climaxed on 14 September with a ceremony held at the end of morning prayer in Hagia Sophia. Recalling the story of Makarios of Jerusalem, the patriarch of Constantinople slowly lifted the Cross over his head in blessing as *Kyrie eleison* was chanted hundreds of times. Two strands of thought are evident in the psalms and hymns accompanying this ritual of the Exaltation: one traceable to Jerusalem that focusses on the Passion and Resurrection of Christ; and another reflecting the geopolitical events of the seventh century that left Byzantium as the guardian of Christendom’s eastern frontier with Islam.

The first two chants on this recording are antiphonal psalms from the service of Vespers celebrated in the rite of the Great Church on the eve of the Exaltation. The psalms that opened evening prayer at Hagia Sophia were begun by soloists, who interrupted a litany to announce the refrain and started the antiphon itself by intoning the first line of its biblical text. The bulk of an antiphon’s text was rendered by two choirs singing in alternation, with each verse punctuated by the refrain. On feast days the Final (*Telutaion*) Antiphon of these opening psalms featured a text appropriate to the occasion, in this case Psalm 98:9: “Exalt the Lord our God: and fall down before his footstool, for he is holy.” Rubrics in south Italian manuscripts indicate that the final antiphons of festal cathedral Vespers used to feature a complete psalm, whereas the late Byzantine setting sung here jumps straight from its single verse to a concluding doxology (“Glory to the Father...”).

The origins of the *Ecclesiastēs* in the popular psalmody of Late Antiquity is more fully revealed in the *Kekragarion*, a term referring collectively to Psalm 140, the invariable lamplighting psalm of Vespers in the rite of Hagia Sophia, and its appointed refrain of the day. Most manuscripts containing music for Constantinopolitan Vespers of the Exaltation provide a tuneful setting in a mode roughly equivalent to C major and a refrain praising the Resurrection of Christ that was regularly employed on Saturday evenings. For this recording, however, we follow the witness of two Thessalonian sources – the musical manuscript Athens 2062 and Athens 2047, manual of cathedral liturgy edited by Symeon of Thessalonica – that offer instead a more austere and probably

older *Kekragarion* in the Second Plagal Mode (Figs. 2–3). Its refrain, introduced by the soloist and then picked up by the choirs (and congregation), is a sober evening hymn also used for the same purpose at Vespers on ordinary Thursdays. Near the end of the psalm (abbreviated on this recording), the choirs pause briefly to signal the arrival of a procession of the higher clergy at the gates of the sanctuary, after which the singing resumes to accompany their entrance into the apse.

Like the sung office of Vespers, the morning service of Orthros in the rite of Hagia Sophia was dominated by biblical psalmody with the addition of only a few short hymns used mainly as refrains. Yet from at least the twelfth century, churches using the Constantinopolitan cathedral rite on 14 September celebrated a hybrid version of Orthros with a special series of twelve antiphons integrating hymnody from the rite of Jerusalem. In late Byzantine musical manuscripts the seventh antiphon in this series begins with an anonymous kalophonic composition labeled “old” (*palaion*) that vastly expands its introductory verse with textual repetitions and teretismata. The following choral rendering of the verses of Psalms 109–111 (abbreviated on this recording) begins in the usual Constantinopolitan manner with the single refrain “Alleluia.” Near the midpoint of Psalm 111 this refrain is displaced by a series of hymns from the rite of the Holy City: Ode 4 of the Kanon of the Exaltation by Kosmas of Jerusalem (ca. 674–ca. 752), which consists of a model stanza (*heirmos*) and a series of metrically identical hymns (*troparia*). Kanons may feature up to nine odes, each

of which corresponds to one of the nine biblical canticles of the morning office in the Palestinian Book of the Hours.

Musical manuscripts provide up to ten chants for the ceremony of the Exaltation of the Cross, from which we have selected two of the most common texts praying for the security of the Roman state and its emperors: “Lord, Save Your People,” heard in both its standard and Asmatikon melodies, and the short choral version of the kontakion prologue “Lifted Up on the Cross.” We then sing the first of a series of hymns for the veneration of the Cross by Emperor Leo VI (“the Wise,” reigned 886–912), whose text alternates between the themes of salvation through the Passion and Resurrection of Christ on the one hand, and the wars of Byzantium with the Arabs (“the people of Ishmael”) on the other, before closing with a collective plea for divine mercy.

On 14 September the Divine Liturgy began immediately after the Exaltation and veneration of the Cross with “Your Cross We Worship,” an ancient hymn from Jerusalem known also in the Latin West. Replacing the usual Trisagion Hymn (“Holy God, Holy Strong, Holy Immortal, have mercy on us”), it was performed in alternation between the higher clergy in the sanctuary and the choirs stationed at the ambo, a raised platform in the nave. Byzantine musical manuscripts transmit two kinds of settings of this chant: a simple one for “common” (*koinon*) use, sung here by the higher clergy, and the florid choral version of the Asmatikon. The choir leaders may be heard guiding their singers with sung directions (“The Second” and “The Third”), only the last of

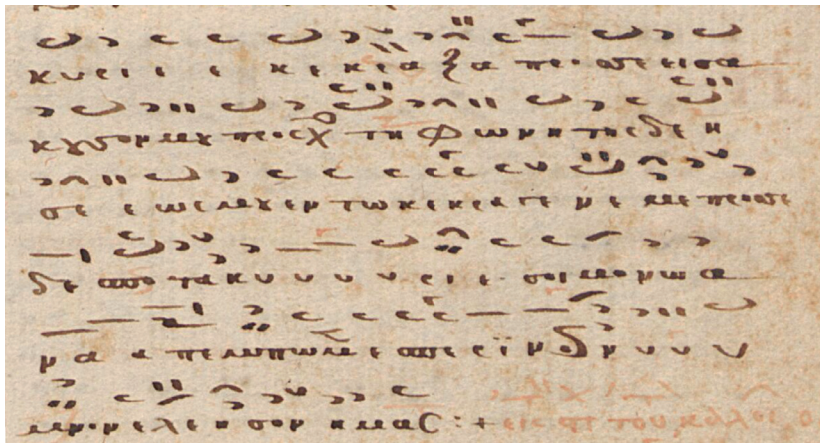


Fig. 2 First verse of the Kekragarion (Ps. 140) "Lord I have called to you, hear me. Give heed to the voice of my supplication when I call upon you" and its refrain "It is only to you, O Lord and Master, that we send up our evening hymn: have mercy on us." From MS Athens 2062, f 54r, reprinted with permission.

which ("*Dynamis*," roughly "[With more] Strength") is still heard in modern Greek practice.

Similar in form to the Gradual of the Roman rite, the *Prokeimenon* is a responsorial chant that followed the blessing of the assembly by the patriarch from his central place in the *synthronon*, a ring of seats for the higher clergy set in the apse. Led by soloists from the top of the ambo, the prokeimenon ("Exalt the Lord Our God") is drawn from the same psalm as the Final Antiphon heard at Vespers the previous evening. In a full celebration of the Divine

Liturgy, the prokeimenon is followed by a reading from the First Epistle of Paul to the Corinthians, then the *Alleluiarion* (another florid responsorial chant with verses from Psalm 73 and the choral refrain "Alleluia"), then the chanting by a deacon of an abbreviated version of the Passion of Christ drawn from the Gospel of John, and several litanies.

In the Divine Liturgies of Saints Basil and John Chrysostom, the Cherubic Hymn is a chant that accompanies the Great Entrance, a solemn procession of the unconsecrated gifts of bread and wine from

the place of their preparation to the altar. The hymn exhorts worshippers to “lay aside every care of this life” as heavenly and earthly liturgy become united “in a mystery,” ideas portrayed in song through elaborate and, in some versions, virtuosic melody. The most elaborate of its oldest musical settings is labelled “Asmatikon” in manuscripts of the fourteenth and fifteenth centuries. Possessing a complex textual tradition with many variants and optional insertions by late Byzantine composers, it is divided into five or more sections for choirs and soloists. Manuscripts of the thirteenth century transmit the choral and solo parts in separate collections, with the former contained in the Asmatikon and the most of the latter in the Asma; the exception is a brief solo passage that first appears in a fourteenth-century Akolouthia (“Services,” or “Offices”) manuscript. On 4 November 2016 Cappella Romana performed at Stanford University a full reconstruction of the “Asmatikon” Cherubic Hymn drawn mainly from thirteenth-century south Italian sources that lasted 22 minutes. For reasons of space in the CD format the present recording contains the complete choral music of the Asmatikon and an excerpt from the third solo section from the Asma. The soloist begins with ecstatic wordless singing on vocables that leads into the concluding line of the Cherubic Hymn, from which the choir repeats the “Alelluia” as a musical coda.

The final variable psalmodic chant of the Divine Liturgy is the Communion Verse, a single line followed by “Alelluia” that originally served as the refrain for an antiphonal performance of an entire psalm. In the tenth century two communion verses were used at Hagia Sophia for the Exaltation of the Cross, the

first (and apparently original) of which is that sung on ordinary Sundays: “Praise the Lord from the Heavens” (Ps. 148:1). The second chant, offered as a bonus track on the Blu-ray™ disc, is transmitted in the Asmatikon and modern service books of the Byzantine rite: “The light of your countenance, Lord, has been signed on us” (Ps. 4:7b).

Selected Bibliography

Balageorgos, Demetrios K. 2001. *Η ψαλτική παράδοση τοῦ Βυζαντινοῦ Κοσμικοῦ Τυπικοῦ*. Edited by Gregorios Stathes, *Institute of Byzantine Musicology, Studies* 6. Athens: Institute of Byzantine Musicology.

Conomos, Dimitri E. 1974. *Byzantine Trisagia and Cheroubika of the Fourteenth and Fifteenth Centuries: A Study of Late Byzantine Liturgical Chant*. Thessalonica: Patriarchal Institute for Patristic Studies.

Flusin, Bernard. 2004. "Les cérémonies de l'Exaltation de la Croix à Constantinople au XI^e siècle d'après le Dresdensis A 104." In *Byzance et les reliques du Christ*, edited by Jannic Durand and Bernard Flusin, 61–89. Paris: Association des amis du Centre d'histoire et civilisation de Byzance.

Frøyshov, Stig Simeon. "Greek Hymnody." *The Canterbury Dictionary of Hymnology* (Canterbury Press). <http://www.hymnology.co.uk/g/greek-hymnody>.

Harris, Simon. 1995. "Mitterlalterliche Byzantinische Erhöhungshymnen." In *Laborare fratres in unum: Festschrift László Dobszay zum 60. Geburtstag*, edited by Janka Szendrei and David Hiley, 87–104. Hildesheim: Weidmann.

Hintze, Gisa. 1973. *Das byzantinische Prokeimena-Repertoire: Untersuchungen und kritische Edition, Hamburger Beiträge zur Musikwissenschaft* 9. Hamburg: Verlag der Musikalienhandlung Karl Dieter Wagner.

Lingas, Alexander. 2013. "From Earth to Heaven: The Changing Soundscape of Byzantine Liturgy." In *Experiencing Byzantium: Papers from the 44th Spring Symposium of Byzantine Studies, Newcastle and Durham, April 2011*, edited by Claire Nesbitt and Mark Jackson, 311–58. Aldershot: Ashgate.

Moran, Neil K. 1975. *The Ordinary Chants of the Byzantine Mass*. 2 vols, *Hamburger Beiträge zur Musikwissenschaft* 12. Hamburg: Verlag der Musikalienhandlung Karl Dieter Wagner.

Moran, Neil K. 1986. *Singers in Late Byzantine and Slavonic painting, Byzantina Neerlandica* 9. Leiden: E.J. Brill.

Parenti, Stefano. 2011. "The Cathedral Rite of Constantinople: Evolution of a Local Tradition." *Orientalia Christiana Periodica* 77:449–69.

Spyrakou, Evangelia Ch. 2008. *Οἱ χοροὶ ψαλτῶν κατὰ τὴν Βυζαντινὴν παράδοσιν*, *Institute of Byzantine Musicology Studies* 14. Athens: Institute of Byzantine Musicology.

Troelsgård, Christian. 2003. "The Repertories of Model Melodies (Automela) in Byzantine Musical Manuscripts." *Acta Musicae Byzantinae* 6:81–94.

Troelsgård, Christian. 2011. "When Did the Practice of Eunuch Singers in Byzantine Chant Begin? Some Notes on the Interpretations of the Early Sources." In *Psaltike: Neue Studien zur Byzantinischen Musik. Festschrift für Gerda Wolfram*, edited by Nina-Maria Wanek, 345–50. Vienna: Praesens.

Williams, Edward V. 1972. "A Byzantine *Ars Nova*: The 14th-Century Reforms of John Koukouzeles in the Chanting of Great Vespers." In *Aspects of the Balkans: Continuity and Change: Contributions to the International Balkan Conference held at UCLA, October 23–28, 1969*, edited by Henrik Birnbaum and Speros Vryonis, Jr., 211–29. The Hague and Paris: Mouton.

BYZANTINE CHANT IN THE SIMULATED ACOUSTICS OF HAGIA SOPHIA

Jonathan S. Abel and Elliot K. Canfield-Dafilou

The performance and experience of music is heavily influenced by the space in which it is heard—halls, churches, and even rooms all have their distinctive “sound.” As a listener, it is just not possible to separate a sound from the space in which it was created. This is because sound arriving at a listener’s ears comes from thousands of reflected and diffracted paths in addition to the sound directly radiated from the source. In a large, highly reflective building such as Hagia Sophia, the overwhelming majority of acoustic energy heard by a listener arrives after substantial interaction with the architectural features and objects in the space. This sound encodes the size, materials, and geometry of the space: in Hagia Sophia the listener is enveloped by waves of diffused arrivals emerging from the colonnades, sparkling reflections raining down from the dome and semi-domes, and pulses of acoustic energy from the apse and Imperial Gate. The experience of hearing chant in Hagia Sophia is almost that the building itself is singing.

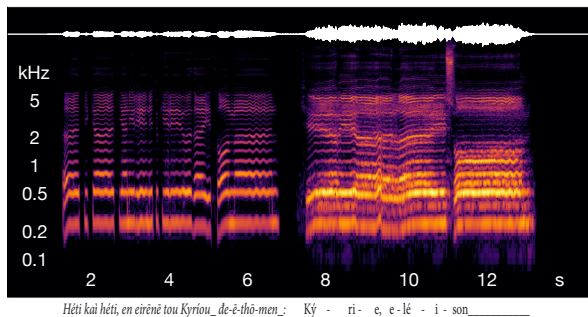
Hagia Sophia is so reverberant and prolongs sound so significantly, that it shapes the way the chanters perform. Its more than 10 seconds of reverberation sets the slow tempi of the music and guides the musical phrasing as the notes linger and overlap in time. The long decay time and bright reflections

from the domes create a dense resonance structure that invites the production of glittering high-frequency harmonics. Add to that the involvement of sound from the domes and colonnades, and the result is a unique sonic experience.

Near the center of the Byzantine Empire, Hagia Sophia was once the largest building in the world. Much music was naturally written to be performed in Hagia Sophia due to its religious significance in the Orthodox Church. During a large portion of the last six centuries, Hagia Sophia served as a mosque, and today it is a UNESCO world heritage site and a museum. The music you hear on this album, while meant to be performed in Hagia Sophia, cannot be sung there today. Instead, we used virtual acoustics: microphones, loudspeakers, acoustical measurements of Hagia Sophia, and signal processing to allow Cappella Romana to record and perform this music in a simulated Hagia Sophia.

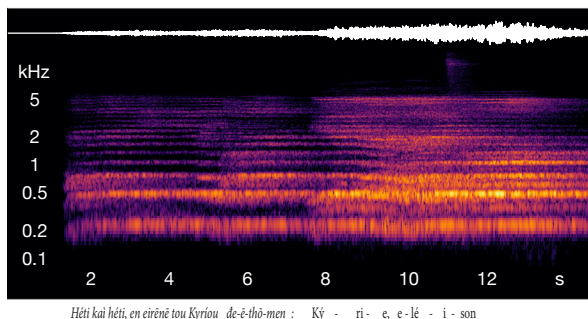
In the following, we explore the transformation of the singing voice by Hagia Sophia, study the acoustics of Hagia Sophia, and describe the technology behind our simulation of the sound of Hagia Sophia for this album. We also point to features of Hagia Sophia’s acoustics that can be readily heard on this album.

We start our exploration with the spectrogram images. The first pair of images in Fig. 1 come from the first track on the album, “Final (Teletauion) Antiphon before the Entrance.” The deacon intones “Again and again in peace, let us pray to the Lord,” (Ἐτι καὶ ἔτι, ἐν εἰρήνῃ τοῦ Κυρίου δεηθῶμεν / *Héti*



kai hēti, en eirēnē tou Kyriou deēthōmen) and the choir responds “Lord have mercy” (Κύριε, ἐλέησον / Kýrie, eléison).

Each image displays the waveform as a white trace across the top, indicating the pressure variation over time that is sound. The lower portion of the image displays a spectrogram which shows sound energy as a function of frequency across time, where quiet signals are in black to magenta and loud parts are in yellow. The spectrogram shows the melody and harmony, much like a musical score. It also displays acoustical features of the specific performance, such as vibrato, pitch glides, and accents.



The upper image was recorded using microphones placed close to each singer's mouth. This is to capture only the “dry” voices and not the acoustics of the room. The

Fig. 1. Dry and wet spectrograms from the “Final (Teleutaion) Antiphon before the Entrance.”

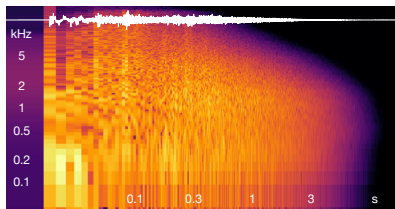


Fig. 2. Spectral impulse response.

plot clearly shows word breaks, and an increased amplitude as the choir joins the soloist.

The lower image is of the dry recording transformed by the acoustics of Hagia Sophia. It is clear that the reverberation smears the words and phrases in time making them run together and overlap. Phonemes that were distinct, each with their own pitch in time, are now blurred together and heard polyphonically.

In large, reverberant spaces, there is often a perception of motion associated with sound. This is partly a result of the reflection structure of the space, with energy coming from different surfaces about the listener arriving at different times. This effect is hinted at in the pair of images in Fig. 1. In the dry recording, the soloist's frequency components are fairly solid in color representing relatively constant amplitude. In contrast, the corresponding frequency components in the reverberated recording are more irregular and scalloped. This is because the reflections arriving at different times are mixing. When reflections overlap in time, they sometimes align and enhance each other, but other times cancel and diminish each other. This natural phenomenon

of amplitude variation gives the listener a perceptual sense of movement.

To further explore how Hagia Sophia processes sound, consider a particularly simple sound called an "impulse:" a pulse so short in duration that details of its shape can't be heard and are irrelevant. Such a pulse produced in Hagia Sophia from the ambo and heard under the edge of the main dome generates the waveform shown in Figure 2, a so-called impulse response. The impulse response is comprised of a direct path at 10 ms, a number of early reflections, including from the main dome near 300 ms, and a lingering, noise-like late-field reverberation. The associated spectrogram shows prominent reflections as vertical features, and the late-field reverberation fading over 10 seconds or so in the mid frequencies, and decaying more quickly at high frequencies.

These impulse response features also appear in the spectrograms of Fig. 1. For example, we see the mid-frequency harmonics significantly extended by Hagia Sophia, while the high-frequency /s/ (the consonant sound "sss") near 11 seconds is extended by a more modest extent.

To simulate the great church for this album, we measured and analyzed impulse responses between the location of a privileged listener and points around the ambo and along a line from the ambo to the apse, similar to where the choristers, soloists, deacons, and priests would be during a service. These measurements were taken using a spatial microphone array having four directional elements in a tetrahedral configuration. Doing so allowed us

to infer the arrival direction of the reflections and reverberation impinging the array. In Fig. 3, these arrival directions are displayed in plan and elevation views as lines extending from the listener position in the direction of the arrival, with lengths indicating the energy of arrival and color-coded according to time of arrival. Note how arriving energy is first focused on the source (which is located in front and to the side), and then blooms to surround the listener, enveloping them with reflections from the colonnades and dome, the apse, and eventually the Imperial Gate.

To simulate the acoustics of Hagia Sophia, consider that the building processes sound in the same way, generating the same reflections and reverberation, irrespective of the sound source. In this way, we can take our understanding of what Hagia Sophia does to an impulse and apply it to chanting voices.

Because Hagia Sophia's reverberation is so rich and long lasting, and the extent to which it influences performance decisions is so great, the performers of Cappella Romana needed to record this music in the acoustics of Hagia Sophia—they needed to react to and interact with the acoustics of the space while they perform. We used close microphones to record the dry vocal signals and used fast, real-time convolution based on our acoustical measurements of Hagia Sophia to create live auralization signals. These reverberant signals were played out loudspeakers while the ensemble performs so they could hear themselves in the simulated Hagia Sophia. In this way, the vocalists could tailor their

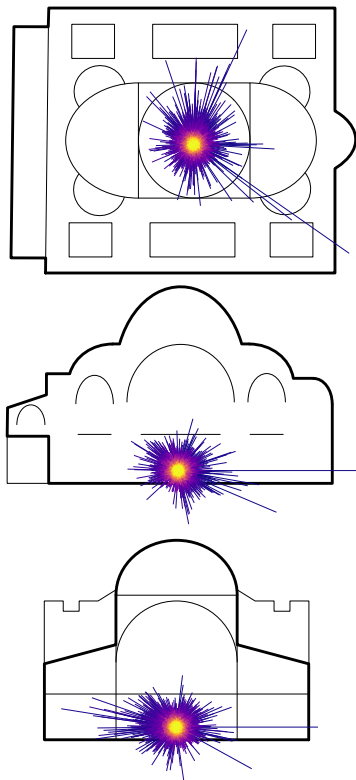


Fig. 3. Plan and elevation direction of arrivals.

performance to the acoustics of Hagia Sophia even though they were in a recording studio.

In addition to the close microphones, the performances were recorded with room microphones positioned to capture a relatively dry mix of the full ensemble. To produce the final stereo and surround mixes, these room microphones and close microphone signals are combined, spatialized with panning, and re-auralized with directional impulse responses from the Hagia Sophia acoustical measurements. The end result is an enveloping, spatial experience.

As you enjoy listening to this album, here are a few things to attend to:

- Listen to how the vocalists use the building as an instrument. The long reverberation time dictates the slow tempi, and the musicians tune their harmonies to the resonances of Hagia Sophia. The isons (drones) fill the space, much like an organ, and the other voices rest on top of this bed. When the vocalists stop singing, hear how the sound lingers for more than 10 seconds as Hagia Sophia's reverberation rings out.
- If listening in surround sound, allow the music to wash over you like water. Notice how reflections off the colonnades, dome, apse, and imperial gate envelope you. These architectural features are audible at different points in the reverberation as the sound ricochets through the space. The sound has movement even though the musicians do not move. Notice how the reflections from the

dome come from above. They sparkle and elevate the music.

- While much of the action occurs on and around the ambo near the center of Hagia Sophia, some of the roles sung by members of Cappella Romana, such as the deacon and priest, are positioned at different spatial locations in the chancel between the ambo and the apse. The voices at these locations sound more diffuse and distant due to the acoustics of these locations.

We hope you enjoy this recording.

Selected Bibliography

Abel, Jonathan S., and Elliot K. Canfield-Dafilou. "Recording in a Virtual Acoustic Environment." In *Proceedings of the 143rd Audio Engineering Society Convention*, 2017.

Abel, Jonathan S., and Kurt James Werner. "Live Auralization of Cappella Romana at the Bing Concert Hall, Stanford University." In *Aural Architecture in Byzantium: Music, Acoustics, and Ritual*, pp. 198–223. Routledge, 2017.

Abel, Jonathan S., Wiesław Woszczyk, Doyuen Ko, Scott Levine, Jonathan Hong, Travis Skare, Michael J. Wilson, Sean Coffin, and Fernando Lopez-Lezcano. "Recreation of the Acoustics of Hagia Sophia in Stanford's Bing Concert Hall for the Concert Performance and Recording of Cappella Romana." In *International Symposium on Room Acoustics*. 2013.

Beranek, Leo L. *Concert and Opera Halls: Music, Acoustics, and Architecture*. Springer Science and Business Media, 2012.

Canfield-Dafilou, Elliot K., Eoin F. Callery, Jonathan S. Abel, and Jonathan Berger. "A Method for Studying Interactions between Music Performance and Rooms with Real-Time Virtual Acoustics." In *Proceedings of the 146th Audio Engineering Society Convention*, 2019.

Farina, Angelo, and Regev Ayalon. "Recording Concert Hall Acoustics for Posterity." In *Proceedings of the 24th International Audio Engineering Society Conference on Multichannel Audio, The New Reality*, 2003.

Gade, Anders. "Acoustics in Halls for Speech and Music." In *Springer handbook of acoustics*, pp. 301–350. Springer, 2007.

Sterne, Jonathan. "Space within Space: Artificial Reverb and the Detachable Echo." *Gray Room* 60 (2015): 110–131.

Tervo, Sakari, Jukka Pätynen, Antti Kuusinen, and Tapio Lokki. "Spatial Decomposition Method for Room Impulse Responses." *Journal of the Audio Engineering Society* 61, no. 1/2 (2013): 17–28.

Ἐκ τοῦ Ἀσματικοῦ Ἑσπερινοῦ

1

Τὸ Τελευταῖον Ἀντίφωνον

Ὁ Διάκονος. Ἐτι καὶ ἔτι, ἐν εἰρήνῃ τοῦ Κυρίου
δεηθῶμεν.

Ὁ Χορός. Κύριε, ἐλέησον.

Ὁ Διάκονος. Ἀντιλαβοῦ, σῶσον, ἐλέησον καὶ
διαφύλαξον ἡμᾶς, ὁ Θεός, τῇ σῇ χάριτι.

Ὁ Δομέστικος. Τὴν οἰκουμένην· ἀλληλούϊα.

Ὁ Διάκονος. Τῆς Παναγίας, ἀχράντου,
ὑπερευλογημένης, ἐνδόξου, Δεσποίνης ἡμῶν
Θεοτόκου καὶ ἀειπαρθένου Μαρίας, μετὰ πάντων
τῶν ἁγίων μνημονεύσαντες, ἑαυτοὺς καὶ ἀλλήλους
καὶ πᾶσαν τὴν ζωὴν ἡμῶν Χριστῷ τῷ Θεῷ
παραθώμεθα.

Ὁ Χορός. Σοί, Κύριε.

Ὁ Ἱερεύς. Ὅτι πρέπει σοι πᾶσα δόξα, τιμὴ καὶ
προσκύνησις, τῷ Πατρὶ καὶ τῷ Υἱῷ καὶ τῷ Ἁγίῳ
Πνεύματι, νῦν καὶ αἰεὶ καὶ εἰς τοὺς αἰῶνας τῶν
αἰώνων.

Ὁ Δομέστικος. Ἀμήν. Ὑψοῦτε Κύριον τὸν Θεὸν ἡμῶν
καὶ προσκυνεῖτε τῷ ὑποποδίῳ τῶν ποδῶν αὐτοῦ, ὅτι
ἅγιός ἐστι. Ἀλληλούϊα.

Οἱ χοροὶ. Ὑψοῦτε Κύριον τὸν Θεὸν ἡμῶν καὶ
προσκυνεῖτε τῷ ὑποποδίῳ τῶν ποδῶν αὐτοῦ, ὅτι

From the Office of Sung Vespers

1

The final antiphon before the entrance

Deacon: Again and again in peace, let us pray to the Lord.

Choir: Lord, have mercy.

Deacon: Help us, save us, have mercy on us, and keep us, O God, by your grace.

Domestikos: The Universe. Alleluia.

Deacon: Commemorating our all holy, pure, most blessed and glorious Lady, Mother of God and Ever Virgin Mary, with all the Saints, let us entrust ourselves and one another and our whole life to Christ our God.

Choir: To you, O Lord.

Priest: For to you belong all glory, honor and worship, to the Father, the Son and the Holy Spirit, now and for ever, and to the ages of ages.

The Choir Leader: Amen. Exalt the Lord our God: and fall down before his footstool, for he is holy. Alleluia.

The choirs. Exalt the Lord our God: and fall down before his footstool, for he is holy. Alleluia. Glory

ἅγιός ἐστι. Δόξα Πατρὶ καὶ Υἱῷ καὶ Ἁγίῳ Πνεύματι,
καὶ νῦν καὶ ἀεὶ καὶ εἰς τοὺς αἰῶνας τῶν αἰώνων·
Ἀμήν. Ἀλληλουῖα.

2

Καὶ εὐθὺς ὁ Δομέστικος

τὸ κεκραγῆριον

**Δέσποτα Κύριε, σοὶ μόνῳ ἀναπέμπωμεν ἑσπερινὸν
ὑμνον· ἐλέησον ἡμᾶς.**

Οἱ χοροὶ ἐναλλάξ.

Κύριε ἐκέκραξα πρὸς σέ, εἰσάκουσόν μου· πρόσχε
τῇ φωνῇ τῆς δεήσεώς μου ἐν τῷ κεκραγέναι με πρὸς
σέ. **Δέσποτα Κύριε, σοὶ μόνῳ...**

Κατευθυνθήτω ἡ προσευχή μου ὡς θυμίαμα ἐνωπιόν
σου· ἔπαρσις τῶν χειρῶν μου θυσία ἑσπερινή.

Δέσποτα Κύριε, σοὶ μόνῳ...

Θοῦ, Κύριε, φυλακὴν τῷ στόματί μου, καὶ θύραν
περιοχῆς περὶ τὰ χεῖλιά μου. **Δέσποτα Κύριε, σοὶ
μόνῳ...**

...

Ἀκούσονται τὰ ῥήματά μου, ὅτι ἡδύνθησαν· ὥσει
πάχος γῆς ἐρράγη ἐπὶ τῆς γῆς, διεσκορπίσθη τὰ
ὀστά αὐτῶν παρὰ τὸν ἅδην. **Δέσποτα Κύριε, σοὶ
μόνῳ...**

to the Father and to the Son and to the Holy Spirit.
Both now and for ever, and to the ages of ages.
Amen. Alleluia.

2

*And immediately the Choir Leader [sings]
the Kekragarion*

**It is only to You, O Lord and Master, that we send
up our evening hymn: have mercy on us.**

The choirs alternately

Lord I have called to you, hear me. Give heed to the
voice of my supplication when I call upon you. **It is
only to You, O Lord and Master...**

Let my prayer be directed towards you like incense;
the lifting up of my hands like an evening sacrifice.

It is only to You, O Lord and Master...

Set a guard, O Lord, on my mouth: and a strong
door about my lips. **It is only to You, O Lord and
Master...**

...

They will hear my words for they are sweet: as a clod
of earth is crushed upon the ground; their bones
have been scattered at the mouth of Hell. **It is only
to You, O Lord and Master...**

Και ψαλλομένου τοῦ στίχου Ἀκούσονται τὰ ῥήματά μου, σιωπῶσιν οἱ ψαλταί, καὶ ὁ διάκονος διὰ τοῦ θυμιαματηρίου σφραγίζων, ἐν μέσῳ ἐκφωνεῖ·

Σοφία, ὀρθοί.

Ὁ πρῶτος δομέστικος, προσκυνήσας τὰς ἁγίας εἰκόνας καὶ τὸν ἀρχιερέα καλεῖ τοὺς ἱερεῖς καὶ ἐκφώνως ψάλλει το εἰσοδικόν·

Ὁ Δομέστικος. Ὅτι πρὸς σέ, Κύριε, Κύριε, οἱ ὀφθαλμοί μου· ἐπὶ σοὶ ἤλπισα, μὴ ἀντανέλης τὴν ψυχὴν μου. Δέσποτα Κύριε, σοὶ μόνῳ ἀναπέμπωμεν ἑσπερινὸν ὕμνον· ἐλέησον ἡμᾶς.

Ἐκ τοῦ Ἀσματικοῦ Ὁρθρου

Ἀντίφωνον Ζ' · Ψδὴ Δ',
Ἦχος πλ. δ'

3

Ὁ Διάκονος. Ἐτι καὶ ἔτι, ἐν εἰρήνῃ τοῦ Κυρίου δεηθῶμεν.

Ὁ Χορός. Κύριε, ἐλέησον.

Ὁ Διάκονος. Ἀντιλαβοῦ, σῶσον, ἐλέησον καὶ διαφύλαξον ἡμᾶς, ὁ Θεός, τῇ σῇ χάριτι.

Ὁ Δομέστικος. Τὴν οἰκουμένην· Ἀλληλουῖα.

Ὁ Διάκονος. Τῆς Παναγίας, ἀχράντου, ὑπερευλογημένης, ἐνδόξου, Δεσποίνης ἡμῶν Θεοτόκου καὶ ἀειπαρθένου Μαρίας, μετὰ πάντων τῶν ἁγίων μνημονεύσαντες, ἑαυτοὺς καὶ ἀλλήλους καὶ πᾶσαν τὴν ζωὴν ἡμῶν Χριστῷ τῷ Θεῷ παραθώμεθα.

Ὁ Χορός. Σοί, Κύριε.

Having sung the verse They will hear my words the chanters quiet themselves, and the deacon, gesturing with the censor in the middle [of the church], exclaims:

Wisdom, arise.

The first choir leader, venerating the holy icons and the hierarch, summons the priests and chants aloud the introit:

Choir leader: For my eyes look to you, O Lord, my Lord: I have hoped in you, do not take away my soul. **It is only to You, O Lord and Master, that we send up our evening hymn: have mercy on us.**

From the Office of Sung Matins (Orthros)

Antiphon 7 with Ode 4 [of the Kanon of the Feast by Kosmas of Jerusalem], Mode plagal 4

3

Deacon: Again and again in peace, let us pray to the Lord.

Choir: Lord, have mercy.

Deacon: Help us, save us, have mercy on us, and keep us, O God, by your grace.

Domestikos: The Universe. Alleluia

Deacon: Commemorating our all holy, pure, most blessed and glorious Lady, Mother of God and Ever Virgin Mary, with all the Saints, let us entrust ourselves and one another and our whole life to Christ our God.

Choir: To you, O Lord.

Ὁ Ἱερεύς. Εἴη τὸ κράτος τῆς βασιλείας σου
εὐλογημένον καὶ δεδοξασμένον, τοῦ Πατρὸς καὶ τοῦ
Υἱοῦ καὶ τοῦ Ἁγίου Πνεύματος, νῦν καὶ ἀεὶ καὶ εἰς
τοὺς αἰῶνας τῶν αἰώνων.

Ἀντίφωνον Ζ' Ψαλμός 109^{ος}

Ὁ δομέστικος· Ἀμήν. Στίχ. Εἶπεν ὁ Κύριος τῷ Κυρίῳ
μου· κάθου ἐκ δεξιῶν μου. Ἀλληλουῖα.

4

Οἱ χοροί·

Στίχ. Εἶπεν ὁ Κύριος τῷ Κυρίῳ μου· κάθου ἐκ
δεξιῶν μου.

Ἀλληλουῖα.

Στίχ. Ἔως ἂν θῶ τοὺς ἐχθρούς σου ὑποπόδιον τῶν
ποδῶν σου. Ἀλληλουῖα.

...

[Ψαλμός. 110^{ος}]

...

Ψαλμός. 111^{ος}

Στίχ. Δόξα καὶ πλοῦτος ἐν τῷ οἴκῳ αὐτοῦ, καὶ ἡ
δικαιοσύνη αὐτοῦ μένει εἰς τὸν αἰῶνα τοῦ αἰῶνος.
Ἀλληλουῖα.

Στίχ. Ἐξανέτειλεν ἐν σκότει φῶς τοῖς εὐθέσιν
ἐλεήμων καὶ οἰκτίρμων καὶ δίκαιος, χρηστός
ἀνὴρ ὁ οἰκτεῖρων καὶ κυχρῶν. Ἀλληλουῖα.

Priest: Blessed and glorified be the might
of your Kingdom, of the Father, the Son
and the Holy Spirit, now and for ever, and
to the ages of ages.

Antiphon 7, Psalm 109

The Choir Leader: Amen. Ψ. The Lord said to my
Lord, “Sit at my right hand.” Ῥ. Alleluia.

4

The Choirs alternately.

Ψ. The Lord said to my Lord, “Sit at my
right hand.”

Ῥ. Alleluia.

Ψ. “Until I make your enemies a footstool for your
feet.” Ῥ. Alleluia.

...

[Psalm 110]

...

Psalm 111

Ψ. Glory and wealth are in his house, and his justice
abides to age on age.
Ῥ. Alleluia.

Ψ. Light dawned in darkness for the upright, he is
merciful, compassionate and just. A good man is
one who is compassionate and lends. Ῥ. Alleluia.

5

Στίχ. Οικονομήσει τοὺς λόγους αὐτοῦ ἐν κρίσει, ὅτι
εἰς τὸν αἰῶνα οὐ σαλευθήσεται.

Ὡδὴ Δ'

Ὁ Εἰρμός

«Εἰσακήκοα Κύριε, τῆς οἰκονομίας σου τὸ
μυστήριον, κατενόησα τὰ ἔργα σου, καὶ ἐδόξασά
σου τὴν Θεότητα».

Στίχ. Εἰς μνημόσυνον αἰώνιον ἔσται δίκαιος, ἀπὸ
ἀκοῆς πονηρᾶς οὐ φοβηθήσεται.

Τροπᾶριον α'

Πικρογόνους μετέβαλε, ξύλῳ Μωϋσῆς πηγὰς ἐν
ἐρήμῳ πάλαι, τῷ Σταυρῷ πρὸς τὴν εὐσέβειαν, τῶν
ἔθνων προφαίνων τὴν μετάθεσιν.

Στίχ. Ἐτοιμή ἡ καρδιά αὐτοῦ ἐλπίζειν ἐπὶ Κύριον.
ἐστήρικται ἡ καρδιά αὐτοῦ, οὐ μὴ φοβηθῇ, ἕως οὗ
ἐπίδη ἐπὶ τοὺς ἐχθρούς αὐτοῦ

Τροπᾶριον β'

Ὁ βυθῷ κολπωσάμενος, τέμνουσαν ἀνέδωκεν
Ἰορδάνης ξύλῳ, τῷ Σταυρῷ καὶ τῷ Βαπτίσματι, τὴν
τομὴν τῆς πλάνης τεκμαιρόμενος.

Στίχ. Ἐσκόρπισεν, ἔδωκε τοῖς πένησιν· ἡ δικαιοσύνη
αὐτοῦ μένει εἰς τὸν αἰῶνα τοῦ αἰῶνος.

Τροπᾶριον γ'

Ἰερῶς προστοιβάζεται, ὁ τετραμερὴς λαὸς
προηγούμενος, τῆς ἐν τύπῳ μαρτυρίου σκηνῆς,
σταυροτύποις τάξεσι κλειζόμενος.

5

¶ He will manage his words with judgment, for he
will never be shaken.

Ode 4.

Heirmos.

I have heard, Lord, the mystery of your dispensa-
tion, I heard and was afraid. I have meditated on
your works and exalt and glorify your Deity.

¶ The just will be held in everlasting memory, he
will not be afraid of an evil report

Troparion 1.

Moses, in the wilderness of old, by means of wood
changed springs of water that bred bitterness, fore-
shadowing the passage of the nations to true religion
by the Cross.

¶ His heart is ready to hope in the Lord, his heart
has been established, he will not be afraid until he
looks upon his enemies.

Troparion 2.

Jordan, that had embraced an axe in its depths, by
wood gave it back, so witnessing to the cutting off of
error by the Cross and Baptism.

¶ He has distributed, he has given to the poor, his
justice abides to age on age.

Troparion 3.

The people in four divisions marched as a sacred
army in close array before the Tabernacle of Witness
in a figure, made glorious by their ranks in the form
of the Cross.

Στίχ. Τὸ κέρας αὐτοῦ ὑψωθήσεται ἐν δόξῃ·
ἀμαρτωλὸς ὀφεται καὶ ὀργισθήσεται, τοὺς δόοντας
αὐτοῦ βρῦζει καὶ τακίησεται.

Τροπάριον δ'

Θαυμασιῶς ἐφαπλούμενος, τὰς ἡλιακὰς βολὰς
ἐξηκόντισεν, ὁ Σταυρός· καὶ διηγῆσαντο, οὐρανοὶ
τὴν δόξαν τοῦ Θεοῦ ἡμῶν.

**Τροπάρια ἐκ τῆς τελετῆς τῆς ὑψώσεως
τοῦ τιμίου καὶ ζωοποιοῦ σταυροῦ**

6, 7

Τροπάριον· Ὕχος α'

Σῶσον Κύριε τὸν λαόν σου καὶ εὐλόγησον τὴν
κληρονομίαν σου, νίκας τοῖς Βασιλεῦσι κατὰ
βαρβάρων δωρούμενος καὶ τὸ σὸν φυλάττων διὰ
τοῦ Σταυροῦ σου πολίτευμα.

8

Κοντάκιον· Ὕχος Δ'

Ὁ ὑψωθείς ἐν τῷ Σταυρῷ ἐκουσίως, τῇ ἐπωνύμῳ
σου καινῇ πολιτείᾳ, τοὺς οἰκτιρμούς σου δώρησαι,
Χριστέ ὁ Θεός. Εὐφρανὸν ἐν τῇ δυνάμει σου, τοὺς
πιστοὺς Βασιλεῖς ἡμῶν, νίκας χορηγῶν αὐτοῖς, κατὰ
τῶν πολεμίων· τὴν συμμαχίαν ἔχιοιεν τὴν σὴν, ὄπλον
εἰρήνης ἀήττητον τρόπαιον.

9

Ποίημα Λέοντος Δεσπότης, Ὕχος β'

Δεῦτε πιστοὶ τὸ ζωοποιὸν Ξύλον προσκυνήσωμεν,
ἐν ᾧ Χριστὸς ὁ Βασιλεὺς τῆς δόξης ἐκουσίως
χεῖρας ἀπλώσας ὕψωσεν ἡμᾶς εἰς τὴν ἀρχαίαν
μακαριότητα, οὗς πρὶν ὁ ἐχθρός, δι' ἡδονῆς
συλήσας, ἐξορίστους Θεοῦ πεποιήκε. Δεῦτε πιστοὶ

Υ. His horn will be exalted in glory. The sinner will
see and be enraged, he will gnash his teeth and melt
away.

Troparion 4.

Wondrously unfurled, the Cross shot forth rays like
the sun, and the heavens declared the glory of our
God.

**Hymns from the Ceremony of the Exaltation
of the Precious and Life-giving Cross**

6, 7

Troparion, Mode 1

Lord, save your people, and bless your
inheritance, granting to the Kings victory
over their enemies, and guarding your
commonwealth by your Cross.

8

Kontakion, Mode 4

Lifted up on the Cross of your own will, to the
new commonwealth that bears your name grant
your mercies, Christ God; make our faithful Kings
glad by your power, granting them victories over
their enemies; may they have your help in battle: a
weapon of peace, an invincible trophy.

9

Sticheron by the Emperor Leo. Mode 2.

Come believers, let us worship the Life-giving
Cross, on which Christ the King of glory, willingly
stretching out his hands, raised us up to our ancient
blessedness, whom the enemy of old had defrauded
through pleasure and made exiles from God. Come

Εὐλον προσκυνήσωμεν, δι' οὗ ἡξιώθημεν, τῶν
ἀοράτων ἐχθρῶν συντρίβειν τὰς κάρας. Δεῦτε πᾶσαι
αἱ πατριαὶ τῶν ἐθνῶν τὸν Σταυρὸν τοῦ Κυρίου
ὑμνοὶς τιμήσωμεν. Χαίροις Σταυρὲ τοῦ πεσόντος
Ἀδάμ ἡ τελεία λύτρωσις, ἐν σοὶ οἱ πιστότατοι
Βασιλεῖς ἡμῶν καυχῶνται ὡς τῇ σῇ δυνάμει,
Ἰσμηλίτην λαόν, κραταιῶς ὑποτάττοντες. Σὲ νῦν
μετὰ φόβου, Χριστιανοὶ ἀπαζόμενοι, καὶ τὸν ἐν σοὶ
προσπαγέοντα Θεὸν δοξάζομεν λέγοντες· Κύριε ὁ
ἐν αὐτῷ σταυρωθεὶς, ἐλέησον ἡμᾶς ὡς ἀγαθὸς καὶ
φιλόανθρωπος.

Ἐκ τῆς Θείας Λειτουργίας

10

Ἀντὶ δὲ τοῦ Τρισαγίου, Ἦχος πλ. β'
Οἱ ἐκτός: Τὸν Σταυρὸν σου προσκυνοῦμεν Δέσποτα,
καὶ τὴν ἁγίαν σου Ἀνάστασιν δοξάζομεν.
Οἱ ἐντός: Τὸν Σταυρὸν σου προσκυνοῦμεν...
Ὁ δομέστικος: Τὸ δεύτερον.
Οἱ ἐκτός: Τὸν Σταυρὸν σου προσκυνοῦμεν Δέσποτα,
καὶ τὴν ἁγίαν σου Ἀνάστασιν δοξάζομεν.
Οἱ ἐντός: Τὸν Σταυρὸν σου προσκυνοῦμεν...
Ὁ δομέστικος: Τὸ τρίτον.
Οἱ ἐκτός: Τὸν Σταυρὸν σου προσκυνοῦμεν Δέσποτα,
καὶ τὴν ἁγίαν σου Ἀνάστασιν δοξάζομεν.
Οἱ ἐντός: Τὸν Σταυρὸν σου προσκυνοῦμεν...
Ὁ δομέστικος: Δόξα τὸ αὐτόν.
Δόξα Πατρί, καὶ Υἱῷ, καὶ Ἁγίῳ Πνεύματι· καὶ νῦν
καὶ ἀεὶ, καὶ εἰς τοὺς αἰῶνας τῶν αἰώνων. Ἀμήν.
Καὶ τὴν ἁγίαν σου Ἀνάστασιν δοξάζομεν.
Δύναμις. Τὸν Σταυρὸν σου προσκυνοῦμεν Δέσποτα,
καὶ τὴν ἁγίαν σου Ἀνάστασιν δοξάζομεν.

believers, let us worship the Wood, through which
we were found worthy to crush the heads of invisible
foes. Come all the families of the nations, let us
honor in hymns the Cross of the Lord, "Hail, O
Cross, the complete redemption of fallen Adam. In
you our faithful Kings boast, as by your power they
mightily subdue the people of Ishmael. We Chris-
tians now greet you with fear, and glorify the God
who was nailed to you, as we say, 'Lord, who was
crucified on it, have mercy on us, as you are good
and love humankind'."

From the Divine Liturgy

10

In place of the Trisagion, Mode Plagal 2
Those outside: Your Cross we worship, O Master, and
your holy Resurrection we glorify.
Those inside: Your Cross we worship...
Domestikos: The Second [rendition].
Those outside: Your Cross we worship, O Master, and
your holy Resurrection we glorify.
Those inside: Your Cross we worship...
Domestikos: The Third [rendition].
Those outside: Your Cross we worship, O Master, and
your holy Resurrection we glorify.
Those inside: Your Cross we worship...
Domestikos: Glory: the same [mode].
Glory to the Father and to the Son and to the Holy Spirit.
Both now and for ever, and to the ages of ages. Amen.
And your holy Resurrection we glorify.
Dynamis. Your Cross we worship, O Master, and
your holy Resurrection we glorify.

11

Προκείμενον τοῦ Ἀποστόλου

Διάκονος: Πρόσχωμεν.

Τερεῦς: Εἰρήνη πᾶσι.

Λαός: Καὶ τῷ πνεύματί σου.

Διάκονος: Σοφία.

Δομέστικος: Ψαλμός τῷ Δαβίδ.

Διάκονος: Πρόσχωμεν.

Δομέστικος: Προκείμενον τοῦ Ἀποστόλου, ἤχος βαρὺς.

Ἵψοῦτε Κύριον τὸν Θεὸν ἡμῶν.

Στίχ. Ὁ Κύριος ἐβασίλευσεν, ὀργιζέσθωσαν λαοί.

Στίχ. Κύριος ἐν Σιών μέγας.

12

Ὁ Χερουβικὸς Ὕμνος. Ἦχος πλ. β’

Ἀπὸ χοροῦ - ἁσματικόν

Οἱ τὰ Χερουβείμ μυστικῶς εἰκονίζοντες,

Μονοφωνάρικον · ὁ δομέστικος μετὰ τῶν σὺν αὐτῷ

[Καὶ τῇ ζωοποιῷ Τριάδι

*Τὸν τρισάγιον ὕμνον προσάδοντες, πάσαν τὴν
βιοτικὴν αποθώμεθα μέριμναν.*

Ἵς τὸν Βασιλέα τῶν ὅλων ὑποδεξόμενοι]

ταῖς ἀγγελικαῖς ἀοράτως δορυφορούμενον

τάξεσιν. Ἀλληλουῖα.

Ἀπὸ χοροῦ - ἁσματικόν

Εἶπε · Ἀλληλουῖα.

Ἐπιγραφόμενον ἐπὶ τὸν δίσκον Blu-ray™

13

Κοινωνικόν, Ἦχος Δ’

Ἐσημειώθη ἐφ’ ἡμᾶς τὸ φῶς τοῦ προσώπου σου

Κύριε. Ἀλληλουῖα.

11

Prokeimenon of the Apostle (Ps 98: 9, 1–2)

Deacon: Let us attend.

Priest: Peace to all.

People: And to your spirit.

Deacon: Wisdom.

Domestikos: A psalm of David.

Deacon: Let us attend.

Domestikos: Prokeimenon of the Apostle, Barys Mode.

Exalt the Lord our God.

Ψ. The Lord has reigned, let peoples rage

Ψ. The Lord is great in Sion

12

Cherubic Hymn. Mode plagal 2

The Choir – The Asmatikon

We, who in a mystery represent the Cherubim...

In the Solo Style – The domestikos and those with him

[And sing the thrice holy hymn

*to the life giving Trinity, let us now lay aside
every care of this life.*

For we are about to receive the King of all]

invisibly escorted by the angelic hosts.

Alleluia.

The Choir – The Asmatikon

Say: Alleluia.

Included on the Blu-ray™ disc

13

Communion verse, Mode 4

The light of your countenance, Lord, has been

signed upon us. Alleluia. (Ps. 4:7b).

PRODUCTION CREDITS

Executive Producer: Mark Powell (Cappella Romana).

Recording, Mixing, Mastering, and Surround Producer;
Digital Editor: Steve Barnett (Barnett Music Productions, Minneapolis, Minn.).

Recording Engineer: Elliot K. Canfield-Dafilou (Center for Computer Research in Music and Acoustics: CCRMA, Stanford University, Stanford, Calif.).

Assistant Engineers: Eoin Callery, François G. Germain (CCRMA).

Live Virtual Acoustics for Recording; Auralization and Surround Engineers: Jonathan S. Abel, Elliot K. Canfield-Dafilou (CCRMA).

Mixing Engineers: Preston Smith (Perfect Record, Saint Paul, Minn.), Elliot K. Canfield-Dafilou.

Mastering Engineer: Preston Smith.

Assistant Postproduction Engineers: Dann Thompson, Robert Gatley (Skywalker Sound, Marin County, Calif.).

Mixing & Mastering Oversight: Alexander Lingas, Mark Powell.

Editing Plot Preparation: John Michael Boyer.

Blu-ray™ authoring: Pure Audio, Munich, Germany.

Original recordings: © & © 2019 Cappella Romana. All rights reserved.

Recorded at the Center for Computer Research in Music and Acoustics (CCRMA), Stanford University, Stanford, Calif.: 7–9 November 2016.

CD mixed and mastered at Perfect Record, St. Paul, Minn.

Surround-sound and high-resolution versions mixed and mastered at Skywalker Sound, a Lucasfilm Ltd. company, Marin County, Calif.

Performing editions: Alexander Lingas (tracks 1–2, 4–10, 12 [Parts 1 & 5], and 13) and Spyridon Antonopoulos (tracks 3, 11, and 12 [Part 4]).

English translations: From the Greek by the late Archimandrite Ephrem (Lash).

Booklet design: Mark Powell, © 2019 Cappella Romana.

Booklet essays: © 2019 by the authors; licensed to Cappella Romana. All rights reserved.

Proofreading: Steve Barnett, Kerry McCarthy, Shanti Michael.

Special thanks to our colleagues at Stanford University: Bissera V. Pentcheva & Alexander Nemerov (Department of Art and Art History); Chris Chafe, Turgut Erçetin, Christopher Jette, Jay Kadis, Nette Worthey, Matthew Wright (CCRMA); Matthew Tiews (Associate Vice President for Campus Engagement); Jenny Bilfeld, Laura Evans, Chris Lowry (Stanford Live); John Etchemendy (Former Provost); Debra Satz (Dean of Humanities and Sciences); Richard Saller (Former Dean of Humanities and Sciences). **Also thanks to:** Leslie Simmons (Cappella Romana); Christian Troelsgård and the Monumenta Musicae Byzantinae; Stephen Cottrell, Laudan Nooshin, Miguel Mera, and Caroline Sipos (City, University of London).

**This recording is made possible in part
with the generous support of:**

The Fred W. Fields Fund of the
Oregon Community Foundation (Creative Heights)

City, University of London

Stanford University: The Center for Computer Research
in Music and Acoustics (CCRMA); Department of Music;
Department of Art & Art History; Stanford Live

The Duca Family

Jonathan S. Abel

Dr. Constantine Kokenes







Left: Cappella Romana in concert at Stanford's Bing Hall, from the documentary film "The Voice of Hagia Sophia" by Duygu Erugman and Bissera V. Pentcheva.

This package contains a Pure Audio Blu-ray™ as well as a standard CD. The Pure Audio Blu-ray will play in any standard Blu-ray player and contains high resolution Surround Sound and Stereo versions of the program material. For more information about Pure Audio Blu-ray, please visit pureaudio-bluray.com

This Pure Audio Blu-ray™ is equipped with the mShuttle application. Connecting the Blu-ray™ player to your home network will enable you to access portable copies of the songs residing on the disc; you may transfer MP3s, FLAC files, and WAV files of your favorite tracks to your mobile player.

1. Make sure that your Blu-ray™ player is connected to your computer network.
2. Insert the Pure Audio Blu-ray™ Disc into your Blu-ray player and press the mShuttle button after the disc is loaded.
3. Open the Internet browser of your computer and type in the IP address of your Blu-ray™ player. You will find this address in the setup menu of your Blu-ray™ player.
4. Select audio files to download from the Blu-ray™ to your computer.

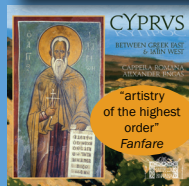


2.0 LPCM STEREO 24bit/48kHz 
 5.1 DTS-HD MA 24bit/48kHz 
 DOLBY ATMOSTM 24/48kHz 
 AURO-3D 24/48kHz 

Bookings and more information:
 Cappella Romana, 620 SW Main St Ste 714, Portland, OR 97205 USA
 TEL +1.503.236.8202 cappellaromana.org



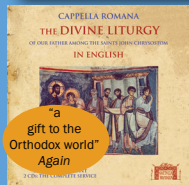
Venice in the East: Renaissance Crete & Cyprus This profoundly beautiful music bears witness to how ancient Greek and Latin liturgical traditions were richly embellished during the Renaissance on the islands of Crete and Cyprus, within the shared cultural space of Venetian rule.



Cyprus: Between Greek East & Latin West 15th-century sacred music in Greek and Latin from Cyprus: hymns praising St. Hilarion of Gaza, prayers for French royalty (from MS Torino J.1.9), and virtuosic Byzantine chants by Constantinopolitan and Cypriot composers.



The Fall of Constantinople Cappella Romana's critically acclaimed program of Byzantine chant and polyphony c. 1453 and motets by Guillaume Dufay explores the musical legacy of New Rome—caught between Latin West and Islamic East.



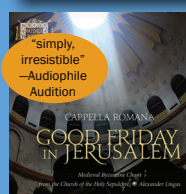
The Divine Liturgy in English in Byzantine Chant The complete service on two CDs, featuring music drawn from the most authoritative traditions of Byzantine chanting. 40-page booklet with extensive essays on liturgy and Byzantine chant.



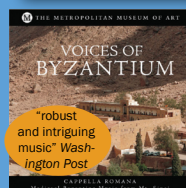
Byzantium in Rome: Medieval Byzantine Chant Led by Ioannis Arvanitis, this 2-CD set bears witness to Constantinopolitan music from before the Latin conquest of 1204, as recorded in manuscripts at the Abbey of Grottaferrata near Rome (founded 1004).



Steinberg: Passion Week Maximilian Steinberg's profoundly moving work extends the musical language of Rachmaninoff's *All-Night Vigil*. With Holy Week motets by Steinberg's teacher and father-in-law Rimsky-Korsakov. Also available on 180g vinyl.



Good Friday in Jerusalem Medieval Byzantine chant for commemorations of Great and Holy Friday in the Church of the Holy Sepulchre, invoking an elaborate stationary liturgy that encompassed the sacred Christian topography of the city of Jerusalem.



Voices of Byzantium: Medieval Byzantine Chant from Mt. Sinai Byzantine musical treasures from cathedrals and monasteries preserved from destruction in the Egyptian desert at the Greek Orthodox Monastery of St. Catherine at Mt. Sinai.

LOST VOICES OF HAGIA SOPHIA

Medieval Byzantine Chant Sung in the Virtual Acoustic of Hagia Sophia

CAPPELLA ROMANA

Alexander Lingas, music director and founder

The Feast of the Exaltation of the Holy Cross in Constantinople

From the Office of Sung Vespers

- | | | |
|---|--|------|
| 1 | Final (Teleutatio) Antiphon before the Entrance
(Ps. 98:9), Mode Plagal 2 | 5:13 |
| 2 | Psalm 140 with Refrain (Kekragarion) | 7:04 |

From the Office of Sung Matins

- | | | |
|------------|--|------|
| Antiphon 7 | | |
| 3 | Small litany and Old Kaloiphonic Antiphon, Mode Plagal 4 | 9:31 |
| 4 | Choral stichologia (selected verses of Ps. 109–112, "Palaion") | 3:21 |
| 5 | Ode 4 of the Canon of the Precious Cross | 6:39 |

From the Ceremony of the Exaltation of the Holy Cross

- | | | |
|--|---|------|
| Troparion: "Lord, save your people" | | |
| 6 | Syllabic melody | 1:09 |
| 7 | Asmatikon melody | 4:23 |
| 8 | Kontakion: "Lifted Up on the Cross," Short melody, Mode 4 | 2:11 |
| 9 | Sticheron, for the Adoration of the Cross
by Emperor Leo VI "The Wise" | 6:02 |
| "Come believers, let us worship the Life-giving Cross," Mode 2 | | |

Selections from the Divine Liturgy

- | | | |
|----|--|-------|
| 10 | Troparion instead of the Trisagion "Your Cross we Worship" | 12:57 |
| 11 | Prokeimenon: (Gradual, Ps. 98:9, 1-2), Barys Mode | 5:23 |
| 12 | Asmatikon Cherubic Hymn | 12:55 |

Additional selection included on the Blu-ray™

- | | | |
|----|--|------|
| 13 | Communion Verse, "The Light of your Countenance," Mode 4 | 3:35 |
|----|--|------|

TOTAL AUDIO TIME CD 76:50

TOTAL AUDIO TIME BLU-RAY™ 80:00

mShuttle
MP3 and FLAC





AURO 3DTM

pure
audio

DOLBY
ATMOS

Blu-ray Disc

COMPACT
disc
DIGITAL AUDIO

2.0 LPCM STEREO 24bit/48kHz 
5.1 DTS-HD MA 24bit/48kHz 
DOLBY ATMOS™ 24/48kHz 
AURO-3D 24/48kHz 

40-page booklet inside with in-depth essays, musical examples, and illustrations about the project, and original texts in Greek with translations in English.

Με κείμενα στα ελληνικά και αγγλικά

Documentary film included on the Blu-ray™

The Voice of Hagia Sophia

A film by Duygu Eruçman. © 2018 Bissera Pentcheva.

23:43

For a thousand years, Hagia Sophia was the largest enclosed space in the world. Its stunning reverberation—over 11 seconds—is re-created on this recording. The first vocal album ever to be recorded entirely in live virtual acoustics, *Lost Voices of Hagia Sophia* will transport you back in time to medieval sound and ritual in Constantinople as an aural virtual reality.

Vocal ensemble Cappella Romana combines passion with scholarship in its exploration of early and contemporary music of the Christian East and West. Its name refers to the medieval Greek concept of the Roman *oikoumene* (inhabited world), which embraced Rome and Western Europe as well as the Byzantine Empire of Constantinople ("New Rome") and its Slavic commonwealth. The acoustics of Hagia Sophia for this recording were synthesized in real time from measurements taken at Hagia Sophia by the *Icons of Sound* team at Stanford University (iconsoundsound.stanford.edu).

© & © 2019 CAPPELLA ROMANA. ALL RIGHTS RESERVED. RECORDED AT CORMA, STANFORD UNIVERSITY. STEREO VERSION MIXED & MASTERED AT PERFECT RECORD, ST. PAUL, MINN. SURROUND-SOUND VERSION MIXED & MASTERED AT SKYWALKER SOUND, A LUCASFILM LTD. COMPANY, MARIN COUNTY, CALIF.

PACKAGE CONTAINS PURE AUDIO BLU-RAY™, STANDARD CD, & DIGITAL COPY (VIA MSHUTTLE). BLU-RAY DISC™, BLU-RAY™, AND THE LOGOS ARE TRADEMARKS OF THE BLU-RAY DISC ASSOCIATION.



cappellaromana.org